REMARKS

This Amendment and Supplemental Request for Reconsideration is filed in response to the Final Office Action dated February 7, 2003 and supplements the Response filed on July 11, 2003.

Prior to entry of this Supplemental Amendment Claims 17-20, 22-30, 32-59 and 61-66 were pending in the Application. On entry of this Reply and Amendment, new Claims 67-79 will be added, claims 38, 51 and 57 are amended , and claim 50 is cancelled. Accordingly, after entry of this Amendment, Claims 17-20, 22-30, 32-49, 51-59 and 61-79 will be pending in this Application.

Applicants appreciate the courtesy extended by the Examiner in conducting a personal interview with Dr. Arvin Montes and applicants' representatives on August 28, 2003.

During the interview, the following issues were discussed. Dr. Montes pointed out that the prior art references applied in the Final Office Action do not teach or suggest a substantially uniform and/or a generally round grain structure, for the reasons provided in his first Declaration and in the Response to the Final Office Action.

The Examiner indicated that Dr. Montes' first declaration was "preliminarily persuasive" that the combination of grain structure and physical properties exhibited by the 7075-T6 aluminum alloy produced by the present method is unexpected in comparison to the prior art. However, the examiner requested that Dr. Montes provide a supplemental declaration explaining why prior art wrought and recrystallized aluminum alloys of the other series of aluminum alloys, such as 6000 series alloys, would not consist essentially of the substantially uniform and generally round grain structure and have the recited physical properties (e.g., tensile strength and/or yield strength).

Applicants submit herewith a Supplemental Rule 132 Declaration of Dr. Montes which explains why prior art wrought and recrystallized aluminum alloys of the other series of aluminum alloys, such as 6000 series alloys, would not consist essentially of

the substantially uniform and generally round grain structure recited in the present claims.

Dr. Montes notes in paragraph 4 of the Supplemental Declaration that the most significant difference between a centrifugal casting and a wrought product is the isotropic properties of the centrifugally cast material. Because aluminum centrifugal castings exhibit an equiaxed grain structure, one can expect properties to be independent of orientation.

Dr. Montes notes in paragraph 7 of the Supplemental Declaration that ideally, recrystallization will produce a completely equiaxed grain structure. Due to non-uniform deformation during the working process, however, recrystallization will initiate at regions of high deformation, while regions that underwent less deformation will recrystallize last. The dependence of recrystallization initiation on location within the work-piece leads to variations in the grain size of the final product. Thus, the grain structure in wrought and recrystallized aluminum alloys will have non-uniform and/or non-equiaxed grain structure irrespective of the aluminum alloy composition due to non-uniform nucleation. Moreover, if cold- or hot-worked alloy materials are heat treated in a manner sufficient to achieve a fully recrystallized state with an equiaxed grain structure, such materials are expected to have a non-uniform grain structure and to exhibit substantially degraded strength properties. Accordingly, it is Dr. Montes' opinion that wrought aluminum alloys, such as 2000, 4000, 6000, 7000 and 8000 series aluminum alloys, even if fully recrystallized, will have non-uniform and/or non-equiaxed grain structure, and moreover, fully annealed alloys of this type will not possess strength properties equivalent to the cast alloys according to the present invention.

Dr. Montes explains in the Supplemental Declaration the reasons why wrought alloys are subjected to non-uniform deformation. Dr. Montes further explains in the Supplemental Declaration that even when wrought aluminum alloys that have been subjected to non-uniform deformation are recrystallized, they will still have a non-uniform and/or a non-equiaxed grain structure due to non-uniform nucleation in the alloy.

The uniform and equiaxed grain structure in aluminum alloys produced by centrifugal casting results in significant improvement of the mechanical properties of the claimed alloys compared to prior art alloys with a uniform and equiaxed grain structure. For example, the ductility of the claimed alloys with uniform and equiaxed grain structure is more uniform than that of wrought alloys. Furthermore, as explained in the Supplemental Declaration, the uniformity of fracture toughness of the claimed alloys with uniform and equiaxed grain structure is better than that of wrought alloys.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

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By _____

FOLEY & LARDNER
Customer Number: 26371

26371
PATENT TRADEMARK OFFICE
Telephone: (202) 672-5414
Facsimile: (202) 672-5399

Richard L. Schwaab
Attorney for Applicant
Registration No. 25,479